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**APPLICATION  
FOR  
UNITED STATES  
LETTERS PATENT**

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FOR: MOBILE COMMUNICATIONS TERMINAL  
DEVICE AND METHOD FOR IDENTIFYING  
INCOMING CALL FOR USE WITH THE SAME

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MOBILE COMMUNICATIONS TERMINAL DEVICE AND METHOD FOR IDENTIFYING  
INCOMING CALL FOR USE WITH THE SAME

BACKGROUND OF THE INVENTION

Field of the Invention

5       The present invention relates to a mobile communications terminal device and a method for identifying an incoming call for use therewith, and more particularly to a method for identifying the information of an originator upon receiving an incoming call in the mobile communication terminal device.

10   Description of the Related Art

Conventionally, in the mobile communications terminal device, means for identifying the originator's information at the time of call incoming employs a method for displaying a telephone number or a mail address of the originator as the  
15   originator's information.

Also, in the mobile communications terminal device, there is another method for displaying the originator's information (which comprises a name of the originator) by registering a name of an originator along with the telephone number and the mail  
20   address as a telephone directory in its own terminal device, and retrieving the name or the like from the telephone directory by the telephone number or the mail address of the originator upon receiving an incoming call.

However, in the conventional mobile communications terminal  
25   device as described above, the user can not easily identify the

originator's information according to a display of incoming call, at the time of carrying a portable terminal of folding structure, or at the time of holding a terminal of non-folding structure in the user's pocket.

5       Also, the originator's information may be obtained by associating the kinds of incoming identification tone with the originator or the contents of incoming call, but if a great number of originators are present, it is difficult to identify clearly the originator on the basis of the kind of abstract incoming  
10   identification tone.

#### SUMMARY OF THE INVENTION

Thus, it is an object of the invention to solve the aforementioned problems and to provide a mobile communications terminal device and a method for identifying an incoming call  
15   for use with the same terminal device, in which an originator in a unit of group or the kind of call incoming can be identified on the basis of the kind of incoming identification tone, without display, and the information designating the originator can be obtained in accordance with an external specification.

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According to this present invention, there is provided a mobile communications terminal device including: storage means for registering beforehand the name of an originator, at least one of the telephone number and mail address of said originator,  
25   the kind of an incoming identification tone at the time of a call incoming from said originator, and a character string corresponding to the voice information designating said originator; voice output means for ringing with the kind of the

incoming identification tone corresponding to said originator  
at the time of the call incoming; and control means for controlling  
said voice output means to output the voice information  
corresponding to the character string registered in said storage  
5 means in response to an external instruction while said voice  
output means is ringing.

Further, according to this present invention, there is  
provided a method for identifying an incoming call in a mobile  
communications terminal device comprising steps of: ringing with  
10 the kind of an incoming identification tone corresponding to  
an originator at the time of a call incoming; and outputting  
the voice information corresponding to a character string  
registered in storage means for registering beforehand the name  
of the originator, at least one of the telephone number and mail  
15 address of said originator, the kind of the incoming  
identification tone at the time of the call incoming from said  
originator, and the character string corresponding to the voice  
information designating said originator, in response to an  
external instruction during the ringing of said incoming  
20 identification tone.

That is, the method for identifying the incoming call  
according to the present invention includes effecting the voice  
output of the originator's information as means for  
discriminating the originator at the time of the call incoming  
25 in the mobile communications terminal device such as a portable  
telephone or the like, thereby enabling the identification to  
be made easily.

In the mobile communications terminal device of the present invention, since the originator's information is output apart from the incoming identification tone, upon activation by the user making a key input, in a state where the incoming  
5 identification tone is ringing at the time of the call incoming, the originator can be identified without regard to the display of the originator's information.

#### BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a block diagram showing a configuration of a mobile  
10 communications terminal device according to one embodiment of the present invention;

FIG. 2 is a block diagram showing an example of one configuration of a voice output section of FIG. 1;

FIG. 3 is a perspective view of the mobile communications  
15 terminal device according to one embodiment of the present invention;

FIG. 4 is a flowchart showing an operation of the mobile communications terminal device according to one embodiment of the present invention;

FIG. 5 is a block diagram showing an example of one  
20 configuration of a voice output section in the mobile communications terminal device according to another embodiment of the present invention; and

FIG. 6 is a flowchart showing the operation of the mobile  
25 communications terminal device according to another embodiment of the present invention.

## DESCRIPTION OF THE PREFERRED EMBODIMENTS

Next, the preferred embodiments of the present invention will be described below with reference to the accompanying drawings. FIG. 1 is a block diagram showing a configuration of a mobile communications terminal device according to one embodiment of the present invention. In the configuration of FIG. 1, the mobile communications terminal device has a voice output function of enabling the voice to be heard sufficiently without needs of bringing the terminal itself closer to the user's ear.

In FIG. 1, a mobile communications terminal device 1 comprises an operation section 11, a display section 12, a voice output section 13, a control section 14, an input/output section 15, a transmitting/receiving section 16 and a memory 17.

The operation section 11 accepts an operation to the terminal device, and the display section 12 displays the status of the terminal device and the required information. To inform an incoming call or a status change of the terminal device, the voice output section 13 outputs the incoming identification tone and the voice information obtained by decoding the ADPCM (Adaptive Differential Pulse Code Modulation) data.

The control section 14 controls the operation of each section constituting the terminal device. The input/output section 15 inputs and outputs the voice in telephone conversation, and the transmitting/receiving section 16 transmits or receives the data in the radio communication. The memory 17 saves the information or settings, and stores the common information or the set information of the terminal device, as well as the waveform

information necessary for generating the waveform of the incoming identification tone and the ADPCM data required to produce the voice information.

FIG. 2 is a block diagram showing one configuration example of the voice output section 13 of FIG. 1. In FIG. 2, the voice output section 13 comprises an incoming identification tone waveform generating section 31, an adder 32, an amplifier 33, a speaker 34, and an ADPCM decoder 35.

In the voice output section 13, when an incoming identification tone rings, the waveform information of the incoming identification tone from the control section 14 is input into the incoming identification tone waveform generating section 31 to generate the waveform of the incoming identification tone, which is then amplified by the amplifier 33, and output as the audio output from the speaker 34, so that the incoming call is informed to the outside.

Also, in the voice output section 13, at the time of voice output, the ADPCM data from the control section 14 is input into the ADPCM decoder 35, decoded into an analog voice waveform, amplified by the amplifier 33, and output as the audio output from the speaker 34, so that the voice information with the ADPCM data is output to the outside.

FIG. 3 is a perspective view of the mobile communications terminal device 1 according to one embodiment of the present invention. In FIG. 3, the mobile communications terminal device 1 has a housing 10 of folding structure. This terminal device is folded and carried in the normal state, and used by opening the housing 10 in the service or display operation.

An antenna 16a receives an electric wave to supply to the receiving circuit in the transmitting/receiving section 16, and radiates a high frequency output from a transmitting circuit as the electric wave. A receiver 15a outputs the received speech voice from the input/output section 15 in the voice service, with the receiver 15a placed onto the user's ear, and a microphone 15b inputs the user's voice as the sending speech voice into the input/output section 15 in the voice speech.

The display section 12 is disposed on the side of the receiver 15a of the folding structure, and the operation section 11 has a main component 11a disposed on the side of the microphone 15b of the folding structure, but a switch 11b placed on a lateral face of the housing 10 so that the user can operate it when the terminal device is folded.

FIG. 4 is a flowchart showing the operation of the mobile communications terminal device according to one embodiment of the present invention. The operation of the mobile communications terminal device according to one embodiment of the present invention will be described below with reference to FIGS. 1 to 4.

First of all, in the mobile communications terminal device 1, a telephone directory editing function is initiated by an operation on the operation section 11. This telephone directory editing function enables the user to enter the name, the telephone number and mail address, and the kind of the incoming identification tone and the voice information as the characters on the operation section 11.



The telephone directory data created in this way is stored in the memory 17, and displayed on the display section 12, as required, by an operation on the operation section 11, whereby the user can inspect the information, and after inspection, 5 performs a telephone call or mail to a destination which is inspected, by an operation on the operation section 11.

When a call or mail is received, the telephone number or mail address registered in the telephone directory can be retrieved by the originator's information (telephone number or 10 mail address) transmitted to its terminal device to display the name of originator on the display section 12 at the time of call incoming.

If the kind of the incoming identification tone corresponding to the individual name is registered in the 15 telephone directory data, the discriminating ringing for the telephone call, the mail or the like occurs along with the incoming identification tone according to the specific name. At this time, the waveform information corresponding to the kind of the incoming identification tone registered in the telephone 20 directory for the name retrieved at the time of the call incoming is input into the incoming identification tone waveform generating section 31.

Further, if a character string corresponding to the voice information for the individual name is registered in the telephone 25 directory, the ADPCM data stored beforehand in the memory 17 corresponding to the character string is input into the ADPCM decoder 35, and the voice information of the character string registered in the memory 17 is output from the speaker 34.

Generally, it is not necessarily beneficial to the user that the voice information is output with the incoming identification tone, because the originator's information may be heard in the surroundings. In this one embodiment of the present invention, the telephone call is ringing with the preset incoming identification tone at the time of the call incoming, and only when the user operates the switch 11b on the operation section 11 to prompt the output of the voice information, its voice information is superimposed.

When the user operates the switch 11b on the operation section 11 to prompt the output of the voice information, the voice information may be output by stopping the output of the incoming identification tone, whereby the voice information can be more easily heard. Further, the vibration of a vibrator, not shown, the voice information indicating the kind of the call incoming or the like, can be utilized instead of the incoming identification tone.

In the mobile communications terminal device 1, in the case where an incoming call occurs in its own device (step S1 in FIG. 4), if the originator's information (telephone number, mail address or the like) is not received (step S2 in FIG. 4), the call is informed with an incoming identification tone specified beforehand by the kind of the call incoming (telephone call, mail reception or the like) (step S3 in FIG. 4). This kind of the incoming identification tone includes an incoming identification tone melody having a variation such as gamut or the like. If a confirmation operation for the call incoming

is made on the operation section 11 (step S4 in FIG. 4), the notification of the incoming identification tone is terminated.

In the mobile communications terminal device 1, when the originator's information is received at the time of the call incoming (steps S1, S2 in FIG. 4), the telephone directory is retrieved by the originator's information (step S5 in FIG. 4), and if there is no matched data in the retrieval (step S6 in FIG. 4), the call is informed with the incoming identification tone specified by the kind of the call incoming (step S3 in FIG. 4) in the same way as when the originator's information is not received. However, in one embodiment of this present invention, the character string of the originator's information can be also output as the voice information.

In the mobile communications terminal device 1, if there is matched data in the telephone directory (step S6 in FIG. 4), the call is informed with the incoming identification tone specified by the kind of the call incoming and the telephone directory (step S7 in FIG. 4). Thereafter, if the user presses the switch 11b on the operation section 11 (step S8 in FIG. 4), the ringing of the incoming identification tone is stopped and the voice information converted from the character string previously registered in the telephone directory is output (step S9 in FIG. 4).

When the output of the voice information is completed, the ringing of the incoming identification tone is resumed (step S7 in FIG. 4). In this case, it may be considered to make such a setting that the ringing is not resumed according to the user's preference. If a confirmation operation for the incoming call

is made on the operation section 11 while the incoming identification tone is ringing (step S10 in FIG. 4), its incoming call operation is completed.

In this way, the contents of the incoming call or the  
5 originator can be identified to a certain level, based on the kind of the incoming identification tone. Hence, the user can obtain the primary identification information with the incoming identification tone. And further, at the time of performing an operation of the switch 11b, the user can purposely obtain  
10 the voice information corresponding to the character string designating the direct originator as the secondary designation information.

In particular, in the case where the originator's information can not be easily identified based on the display  
15 at the time of call incoming, such as when the user carries the terminal of folding structure, or contains the terminal of non-folding structure within the pocket or the like, the user can obtain the voice information designating the originator by making an operation of the switch 11b (according to the user's  
20 will).

If the kind of the incoming identification tone is associated with the kind of call incoming, a plurality of persons or a group, but not a single particular person, the originators can be narrowed to several names based on the incoming identification tone, and  
25 the originator can be further designated by the operation of the switch 11b. Accordingly, the facility at the time of call incoming can be enhanced in the situation where the user daily carries the mobile communications terminal device 1.

FIG. 5 is a block diagram showing an example of one configuration of a voice output section in the mobile communications terminal device 1 according to another embodiment of the present invention. In FIG. 5, a voice output section 18 according to another embodiment of the present invention has the same configuration as the voice output section 13 according to the one embodiment of the present invention and shown in FIG. 2, except that a volume 36 is provided. In these drawings, the same numerals are attached to the same or like components. In operation, the same components perform the same or like functions as those of the one embodiment of the present invention.

In the voice output section 18, when the incoming identification tone is ringing, the waveform information of the incoming identification tone is input from the control section 14 into the incoming identification tone waveform generating section 31 to generate the waveform of the incoming identification tone, which is then amplified by the amplifier 33, and output as the audio output from the speaker 34, so that the incoming call is informed to the outside. In this case, the volume 36 is interposed between the incoming identification tone waveform generating section 31 and the amplifier 33, and enables the volume of the incoming identification tone to be changed relative to the voice output.

Also, in the voice output section 18, at the time of the voice output, the ADPCM data from the control section 14 is input into the ADPCM decoder 35, decoded into the analog voice waveform, amplified by the amplifier 33, and output as the audio output

from the speaker 34, whereby the voice information with the ADPCM data is output to the outside.

FIG. 6 is a flowchart showing the operation of the mobile communications terminal device according to another embodiment of the present invention. Referring to FIGS. 1, 5 and 6, the operation of the mobile communications terminal device according to another embodiment of the present invention will be described below. The internal structure of the mobile communications terminal device according to another embodiment of the present invention is the same as that of FIG. 1, except that the voice output section 18 is disposed in place of the voice output section 13. Its appearance is shown in FIG. 3.

In the mobile communications terminal device 1, when the incoming call occurs in its own device (step S21 in FIG. 6), if the originator's information (telephone number, mail address or the like) is not received (step S22 in FIG. 6), the call is informed with the incoming identification tone specified beforehand by the kind of the call incoming (telephone call, mail reception or the like) (step S23 in FIG. 6). This kind of the incoming identification tone includes an incoming identification tone melody having a variation such as gamut or the like. If a confirmation operation for the call incoming is made on the operation section 11 (step S24 in FIG. 6), the notification of the incoming identification tone is terminated.

In the mobile communications terminal device 1, when the originator's information is received at the time of the call incoming (steps S21, S22 in FIG. 6), the telephone directory is retrieved by the originator's information (step S25 in FIG.

6), and if there is no matched data in the retrieval (step S26 in FIG. 6), the call is informed with the incoming identification tone specified by the kind of the call incoming (step S23 in FIG. 6) in the same way as when the originator's information is not received. However, in this another embodiment of the present invention, the character string of the originator's information can be also output as the voice information.

In the mobile communications terminal device 1, if there is matched data in the telephone directory (step S26 in FIG. 6), the call is informed with the incoming identification tone specified by the kind of the call incoming and the telephone directory (step S27 in FIG. 6). Thereafter, if the user presses the switch 11b on the operation section 11 (step S28 in FIG. 6), the volume of ringing the incoming identification tone is relatively reduced by a predetermined amount and the voice information converted from the character string previously registered in the telephone directory is output (step S29 in FIG. 6).

When the output of the voice information is completed, the volume of ringing the incoming identification tone is restored to its original volume (step S30 in FIG. 6), and the ringing of the incoming identification tone is resumed again (step S27 in FIG. 6). In this case, it may be considered to make such a setting that the ringing is not resumed according to the user's preference. If a confirmation operation for the incoming call is made on the operation section 11 while the incoming identification tone is ringing (step S31 in FIG. 6), the call incoming operation is completed.

In this way, the voice information is superimposed by reducing the volume of the incoming identification tone relatively at the time of outputting the voice information. Therefore, after the user obtains the primary identification  
5 information by ringing the incoming identification tone, the user can surely hear the voice information intentionally, and obtain the voice information designating the originator. Also, while the ringing of the incoming identification tone is continued, the user can obtain the voice information relatively unnoticeably,  
10 although the user may feel anxious about the voice output of the originator's information spreading over the surroundings in some cases.

As described above, this present invention has the effects that due to comprising including the steps of ringing with the  
15 kind of the incoming identification tone corresponding to the originator at the time of the call incoming, and outputting the voice information corresponding to the character string registered in storage means for registering beforehand the name of the originator, at least one of the telephone number and mail  
20 address of the originator, the kind of the incoming identification tone at the time of the call incoming from the originator, and the character string corresponding to the voice information designating the originator in response to an external instruction during the ringing of the incoming identification tone, it is  
25 possible to identify the originator in a unit of group or the discriminating ringing by depending on the kind of the incoming identification tone without regard to the display, and obtain



the information designating the originator in accordance with an external specification.